Appl. No.: 10/060,826
Amdt. Dated: 4/27/2004
Off. Act. Dated: 10/27/2003

REMARKS/ARGUMENTS

Applicant has carefully considered all of the Examiner's comments. Claims 1-20 are pending and rejected. Applicant traverses all rejections, and respectfully requests reconsideration of this application in view of the discussion presented herein.

1. **Objection of Claim 18.**

The Examiner requires the word "multicusp" to be spelled as "--multi-cusp--" in claim 18. Applicant respectfully traverses this requirement, as "multi-" is defined in the **McGraw-Hill Dictionary of Scientific and Technical Terms Fifth Edition**, 1994 as:

> **multi-** [SCI TECH] A prefix meaning many.

A prefix is combined with the word it modifies, it is not hyphenated. Thus, in common idiomatic English, we fail to see multi-ple, multi-ply, multi-cycle, multi-cellular, since in every instance there is no hyphen separating the multi- and the stem to be modified by a prefix meaning many.

Although Applicant has failed to find particular dictionary entries for either "multi-cusp" or "multicusp", Applicant does note that a USPTO search of the issued US patents from 1976 - present finds 41 patents using "multi-cusp", and 54 patents using "multicusp". Thus, based solely on issued US patents, it appears that the terms are at least alternate spellings, and equally usable. Thus Applicant respectfully requests to use the form "multicusp", and reconsideration of this objection.

2. **Rejection of Claims under 35 U.S.C. 102(e).**

1.a General comments regarding 35 U.S.C. 102(e) anticipation

The requirements for anticipation follow: "To anticipate a claim, the reference must teach every element of the claim." MPEP 2131. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Inherency is further defined by the courts: "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

With these general comments regarding anticipation, Applicant now reviews the various 35 U.S.C. 102(e) reference rejections.

1.b Rejection of claims 1, 2, 11, 12 and 13 under 35 U.S.C. 102(e) as being anticipated by Mavretic et al.

The Examiner rejected claims 1, 2, 11, 12 and 13 under 35 U.S.C. 102(e) as being anticipated by Mavretic et al. (US 6,424,232). Prior to discussing each individual rejection, Applicant first would like to clarify the "series resonance configuration" terminology that is used in Applicant's application.

The term "series resonance" is defined in the **McGraw-Hill Dictionary of Scientific and Technical Terms Fifth Edition**, 1994 as:

> **series resonance** [ELEC] Resonance in a series resonant circuit, wherein the inductive and capacitive reactances are equal at the frequency of the applied voltage' the reactances then cancel each other, reducing the impedance of the circuit to a minimum, purely resistive value.

The above definition is in turn reliant on the term "series resonant circuit", which, in the same reference, is defined as:

> **series resonance circuit** [ELEC] A r sonant circuit in which the capacitor and coil are in series with the applied alternating-current voltage.

In both of the above definitions it is important to know that "series" is defined in the same reference as:

> **series** [ELEC] An arrangement of circuit components end to end to form a single path for current.

Applicant's claim 1 contains the element: "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration". Thus, it appears that a series resonance configuration, as used in Applicant's claim 1 and interpreted by the reference definitions above, places "a variable capacitor and an inductor" end to end to form a single path for current. With this in mind, the Examiner's specific rejections will now be analyzed.

Regarding the Claim 1 rejection, the Examiner states that "Mavretic discloses a matching network...comprising: a resonantly tunable circuit formed of a variable capacitor (306) and an inductor (307) in a series resonance configuration." However, variable capacitor (306) is not placed end to end with the inductor (307), as is readily apparent in Figures 3, 6, and 8. A series capacitor would instead be illustrated by fixed (i.e. non-variable) capacitor 308 as seen in the same Figures. Thus, Mavretic et al. fails to disclose the "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration" of Applicant's claim 1, as the variable capacitor (306) is not placed end to end with the inductor (307), and further forms a two-path current, not a single current path. Therefore, Mavretic et al. fails to disclose every element of claim 1, and therefore cannot be a valid 35 U.S.C. 102(e) reference. Applicant respectfully traverses this rejection, and requests reconsideration.

Regarding claims 2 and 11, these claims are dependent upon claim 1 which was discussed above as not being anticipated by Mavretic et al. Since dependent claims are narrower than their base independent claim, these dependent claims cannot be anticipated by Mavretic et al. since the independent claim 1 is not so anticipated. Applicant respectfully traverses these rejections, and requests reconsideration.

Similar to claim 1, ind pendent claim 12 also comprises the limitation of "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series

resonance configuration". The arguments made above regarding claim 1 are herein incorporated by reference. Mavretic et al. fails to disclose the variable capacitor and inductor in a series resonance configuration, therefore fails as a 35 U.S.C. 102(e) reference. Applicant respectfully traverses the rejection, and requests reconsideration.

Narrower claim 13 depends from broader independent claim 12 discussed above. Since Mavretic et al. was shown not to anticipate claim 12, claim 13 must also not be anticipated. Applicant respectfully traverses the rejection, and requests reconsideration.

2. Rejection of Claims under 35 U.S.C. 103(a).

2.a General remarks on obviousness under 35 U.S.C. 103(a).

"To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, to modify the reference or to combine reference teachings as discussed in subsection 3 (b) MPEP 2143.03. Additionally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985) MPEP 2142.

2.b Rejection of Claims 3, 4, 6-10 and 14-17 under 35 U.S.C. 103(a) as being unpatentable over Mavretic in view of Patrick.

The Examiner rejected Claims 3, 4, 6-10 and 14-17 under 35 U.S.C. 103(a) as being unpatentable over Mavretic et al (6,424,232) in view of Patrick et al. (5,578,165).

Applicant respectfully traverses the rejections, responds below, and requests reconsideration of the claims in question.

MPEP § 2143 requir s that "[t]o establish a prima facie cas of obviousn ss, three basic criteria must be m t. First, there must be some suggestion or motivation,

either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."

The Examiner's states that Mavretic et al. "essentially discloses the claimed invention". Applicant knows of no statutory requirement of "essential" disclosure. However, Applicant has fully discussed Mavretic et al. above as not teaching Applicant's claim 1 limitation of "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration". The arguments above are herein incorporated by reference, and reiterated that Mavretic et al. fails to teach "a variable capacitor and an inductor in a series resonance configuration". Mavretic does teach an inductor and fixed capacitor in series, but this is not the same thing as a variable capacitor and inductor in series.

Referring to the prima facie obviousness requirements described above, Mavretic et al. fails to supply any suggestion or motivation to change the topological configuration of the circuit. Further, a parallel tuning circuit is separate and distinct from a series tuning circuit: one does not imply the other in any manner.

Therefore, Mavretic et al. fails as a 35 U.S.C. 103(a) reference, as it fails to teach or suggest all the claim limitations.

Regarding 35 U.S.C. 103(a) rejections of claims 3, 4, 6-10, and 14-17, one sees that claims 3, 4, and 6-10 depend from independent claim 1, and claims 14-17 depend from claim 12. Both independent claims 1 and 12 comprise the limitation of "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration ". Thus, by 35 U.S.C. 112, fourth paragraph, which states 'a claim in a dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers', the dependent claims 3, 4, 6-10, and 14-17 also c ntain the same limitation. As d scribed abov , Mavretic et al. fails to supply motivation or t aching of "a variable capacitor and an inductor in a series resonance

configuration". Patrick et al. likewise fails to provide such motivation or teaching. Therefore both the Mavretic et al. and Patrick et al. references fail to teach a limitation required in the dependent claims 3, 4, 6-10, and 14-17, and therefore cannot form a valid 35 U.S.C. 103(a) rejection either separately or one read in view of the other.

Following the line of reasoning above, the Examiner failed to cite any 35 U.S.C. 103(a) rejections of either independent claim 1 or 12. Therefore, any dependent claim of either independent claim 1 or 12 should likewise be nonobvious since such dependent claims must incorporate by reference the limitations of the claims to which they refer, i.e. the uncited independent claims 1 and 12. "With respect to dependent claims, 35 U.S.C. 112, fourth paragraph, should be followed. This paragraph states that 'a claim in a dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers' and requires the dependent claim to further limit the subject matter claimed." MPEP 2164.08. Applicant therefore respectfully requests reconsideration of claims 3, 4, 6-10, and 14-17 on these bases.

Further specific comments follow in the order advanced by the Examiner.

Regarding claim 3, the Examiner states that it would be obvious to tune the windings of "as taught by Patrick in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation". Such tuning would have had the effect of either a variable-turn transformer (to "adjust a desired effective coupling"), or a variable inductance (to "allow for the loading of the circuit"). Either of these methods fails to incorporate a variable capacitor to achieve such tuning. Nowhere in Applicant's invention is there taught a variable transformer or inductor, and neither varies capacitance. Applicant therefore respectfully requests reconsideration.

Regarding claim 4, the Examiner states that it would have been "obvious...to provide a plurality of ferrite cores in Mavretic to regulate the magnetic field to attain a desired voltage output." However, Applicant teaches "a resonantly tunable circuit formed of a variable capacitor and an inductor in a s ries resonance configuration",

which uses a variable capacitor, not variable ferrite cores, to achieve a resonantly tunable circuit. Applicant therefore respectfully requests reconsideration.

Regarding claim 6, the Examiner states that it would have been "obvious...to adapt the ratio of Patrick in Mavretic in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation." However, Applicant teaches "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration", which uses a variable capacitor, not variable turns ratios, to achieve a resonantly tunable circuit. Applicant therefore respectfully requests reconsideration.

Regarding claim 7, the Examiner states Mavretic "discloses that the turn ratio of the windings is selected to transform the plasma impedance of the plasma generator to 50Ω." However, Applicant teaches "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration", which uses a variable capacitor, in a series resonance configuration as described above, not the switched parallel capacitors of Mavretic, which are not configured for series resonance. Applicant therefore respectfully requests reconsideration.

Regarding claim 8, the Examiner states Mavretic "essentially discloses ... that the transformer comprises a core being made of 12 ferrite cores..." However, Applicant has read Mavretic, finding at col. 4, lines 31-32 that "Within the impedance matching network 220, RF transformer 305 may or may not be utilized " (emphasis added), which teaches that the transformer is in fact not necessary, contrary to Applicant's limitation of "a ferrite core transformer". Further, a quick search of Mavretic fails to even find either of the words "core" or "ferrite". Therefore, Mavretic cannot teach of another of Applicant's claimed limitations, and therefore cannot be an effective 35 U.S.C. 103(a) reference. Applicant therefore respectfully requests reconsideration.

Regarding claim 9, the Examiner states "Mavretic discloses a variable capacitor (306)". However, as repeatedly described above, and herein incorporated by reference, Applicant teaches "a resonantly tunable circuit formed of a variable capacit r and an inductor in a series resonance configuration", which us s a variable capacitor in a

series resonance configuration, not a variable capacitor in a parallel resonance configuration, to achieve a resonantly tunable circuit. Furthermore, what Mavretic discloses as variable capacitor (306) is actually discretely paralleled capacitors, as stated in Mavretic et al. col. 4, lines 38-43:

> "A capacitance 306 is comprised of at least one fixed-value capacitor 312. In one embodiment, an additional number of capacitors may be coupled in parallel to capacitor 312, as is illustrated by capacitor 313. Sufficient capacitors may be coupled in parallel to capacitor 312 to provide, for example, 8, 16, or more discrete values." (emphasis added)

Mavretic never teaches Applicant's claimed limitation of a series variable capacitor, and therefore cannot be a valid 35 U.S.C. 103(a) reference. Applicant therefore respectfully requests reconsideration.

Regarding claim 10, Applicant incorporates by reference the above arguments differentiating from Mavretic, including, but not limited to the immediately above argument that Mavretic never teaches Applicant's claimed limitation of a series variable capacitor, and therefore cannot be a valid 35 U.S.C. 103(a) reference. Applicant therefore respectfully requests reconsideration.

Regarding claim 14, the Examiner states that it would have been "obvious...to tune the windings of Mavretic...as taught by Patrick in order to adjust a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation." However, Applicant teaches "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration", which uses a variable capacitor, not variable turns ratios, to achieve a resonantly tunable circuit. As previously discussed above, a variable capacitor and a variable transformer are two very nonanalogous devices. Where such a device is interchangeable, the Examiner must show some teaching or motivation for such interchange, and some reasonable expectation of success. Again, here the variable element is a capacitor, which Patrick does not teach.

Further, Patrick does teach "a primary coil 36 and a secondary loop 38 which may be mutually positioned to adjust the effective coupling of the circuit" (Patrick et al. at col. 3, lines 10-13. Again, this effects variable coupling, not a variable capacitor. Applicant therefore respectfully requests reconsideration.

Regarding claim 15, the Examiner states "it would have been obvious to ... provide a plurality of ferrite cores in Mavretic to regulate the magnetic field in order to attain a desired voltage output." However, as stated above, Applicant has read Mavretic et al., finding at col. 4, lines 31-32 that "Within the impedance matching network 220, RF transformer 305 may or may not be utilized " (emphasis added), which teaches that the transformer is in fact not necessary, contrary to Applicant's limitation of "a ferrite core transformer". Further, a quick search of Mavretic fails to even find either of the words "core" or "ferrite". Therefore, Mavretic cannot teach yet another of Applicant's claimed limitations, i.e. a ferrite core transformer. Applicant therefore respectfully requests reconsideration.

Regarding claim 16, the Examiner states that it would have been obvious to "adapt the ratio of Patrick in Mavretic in order to attain a desired effective coupling of the circuit and allow for the loading of the circuit at a desired frequency of operation." However, as stated above and incorporated herein by reference, Mavretic et al. fails to teach a variable capacitor in a series resonant configuration, and further teaches that a transformer is optional, stating at col. 4, lines 31-32 that "Within the impedance matching network 220, RF transformer 305 may or may not be utilized " (emphasis added), which teaches that the transformer is in fact not necessary, contrary to Applicant's limitation of "a ferrite core transformer". Further, a quick search of Mavretic fails to even find either of the words "core" or "ferrite". Therefore, Mavretic cannot teach yet another of Applicant's claimed limitations, i.e. a ferrite core transformer.

Another search of Mavretic fails to find the word "ratio", thus, in Mavretic there is no suggestion or motivation for varying such, as Mavretic varies his impedance matching network by switching a suitabl plurality of parallel capacitors. Patrick et al. as previously discussed above, varies the spatial location as follows: "a primary coil 36 and

a secondary loop 38 which may be mutually positioned to adjust the effective coupling of the circuit" (Patrick et al. at col. 3, lines 10-13). This effects variable coupling, not a turns ratio. Therefore, there is nothing between Patrick and Mavretic to provide a suggestion or motivation to combine the two cases to adjust the turns ratio. The only possible motivation for such a combination would be impermissible hindsight. Applicant therefore respectfully requests reconsideration.

Regarding claim 17, the Examiner has failed to state a ground for rejection. However, assuming arguendo that a rejection would have been based on 35 U.S.C. 103(a), claim 17 depends from claim 12, which incorporates a variable capacitor in a series resonant configuration. Incorporating the arguments made above by reference, Mavretic fails to disclose such variable capacitor in a series resonant configuration. As this is an essential limitation of independent claim 12 that is not taught, Mavretic cannot in turn teach all of the limitations of claim 17, and cannot therefore be a valid 35 U.S.C. 103(a) reference. Applicant therefore respectfully requests reconsideration.

2.c Rejection of Claim 5 under 35 U.S.C. 103(a) as being unpatentable over Mavretic.

Regarding claim 5, the Examiner states that it would have been "obvious...to provide a plurality of ferrite cores in Mavretic to regulate the magnetic field to attain a desired voltage output." However, Applicant teaches "a resonantly tunable circuit formed of a variable capacitor and an inductor in a series resonance configuration", which uses a variable capacitor, not variable ferrite cores, to achieve a resonantly tunable circuit.

Applicant has read Mavretic, finding at col. 4, lines 31-32 that "Within the impedance matching network 220, RF transformer 305 may or may not be utilized " (emphasis added), which teaches that the transformer is in fact not necessary, contrary to Applicant's limitation of "a ferrite core transformer". Further, a quick search of Mavretic fails to even find ither of the words "core" or "ferrite". Therefore, Mavretic

cannot teach of another of Applicant's claimed limitations. Applicant therefore respectfully requests reconsideration.

2.d Rejection of Claims 18-20 under 35 U.S.C. 103(a) as being unpatentable over Mavretic in view of Ichimura.

Regarding claim 18, the Examiner states that it would have been "obvious...to adapt the teaching of Ichimura, using magnet trains arranged in Mavretic, in order to obtain the above advantage such as much easily to generate neutralized plasma." However, Applicant notes that Ichimura (5,750,987) discloses no matching network whatsoever, whereas Mavretic discloses only an RF matching network. As Applicant presently understands the patents, Mavretic cannot be used with Ichimura, as Ichimura contains no reference to "RF", "matching" or "network". Further, Mavretic contains no reference to "cusp". Therefore, since both references fail to have any point of commonality, Applicant respectfully requests Examiner to point out specific passages in either or both references which provide a suggestion or motivation to combine the two. Applicant hereby respectfully requests reconsideration.

Regarding claims 19 and 20, Applicant hereby incorporates by reference the arguments made above, and points out that "With respect to dependent claims, 35 U.S.C. 112, fourth paragraph, should be followed. This paragraph states that 'a claim in a dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers' and requires the dependent claim to further limit the subject matter claimed." MPEP 2164.08. Applicant therefore respectfully requests reconsideration of claims 19 and 20 on this basis since these claims depend on claim 18 discussed above.

3. **Claim Amendments.**

Applicant has not made any amendments.

4. **Additi nal Claim Fees.**

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Applicant has no additional claim fees.

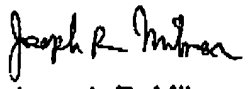
5. Conclusion.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejections of the claims and to pass this application to issue.

The Applicant also respectfully requests a telephone interview with the Examiner in the event that there are questions regarding this response, or if the next action on the merits is not an allowance of all pending claims.

Date: April 27, 2004

Respectfully submitted,



Joseph R. Milner, Ph. D., Reg. No. 42,896
Lawrence Berkeley National Laboratory
One Cyclotron Road, Mail Stop 90B0104
Berkeley, CA 94720
(510) 486-4672